

REMARKS

Claims 1-31 are pending in this application. The Office Action withdraws claims 23-31; and rejects claims 1-22 under 35 U.S.C. §103(a). Applicants incorporate the subject matter of claims 1 and 14 into claim 15, amend claims 18 and 21, and respectfully traverse the rejection.

Applicants thank the Examiner for indicating that the subject matter of claims 15-22 is allowable if the claims are rewritten in independent form to include all the limitations of any intervening or base claims.

I. Withdrawn Claims

The Office Action withdraws claims 23-31 as drawn to a non-elected invention. Applicants confirm election of Group I, claims 1-22, with traverse. It is respectfully submitted that the subject matter of all claims 1-31 is sufficiently related that a thorough search for the subject matter of any one Group of claims would encompass a search for the subject matter of the remaining claims. Thus, it is respectfully submitted that the search and examination of the entire application could be made without serious burden. See MPEP §803 in which it is stated that "if the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to independent or distinct inventions" (emphasis added). It is respectfully submitted that this policy should apply in the present application in order to avoid unnecessary delay and expense to Applicants and duplicative examination by the Patent Office.

For at least the foregoing reasons, claims 1-31 should be rejoined and are allowable.

II. Rejections under 35 U.S.C. §103(a)

The Office Action rejects claims 1-22 under 35 U.S.C. §103(a) over Smith and further in view of Bhardwaj, Wasserman, Supcoe, and Mar. The Office Action asserts that Smith discloses each feature of instant claim 1, except for operating the machine for a

predetermined period of time, applying a marker paint that does not change color to the machine, and marker paints with high infrared and visible reflectivity. However, the Office Action asserts that Bhardwaj teaches operating a machine until it reaches operating conditions, and that Wasserman and Supcoe each teach applying a marker paint to a component of the machine that does not change color and that is reflective. Applicants incorporate the subject matter of claims 1 and 14 into claim 15, amend claims 18 and 21, and respectfully traverse the rejection.

Instant claim 1 is directed toward a method for analyzing irreversible temperature indicating paint that is applied to components of engines. As the engine is run for several minutes at normal operating conditions, the paint changes color at one or more known temperatures. These color changes of the indicating paint indicate the temperature to which various components of the machine have been subjected. The paint thus produces a temperature profile over the entire surface of the component. See specification at page 1, lines 1-17.

A typical problem associated with irreversible temperature indicating paint is that debris and/or dirt may be deposited on the paint during operation, thus masking its color. This makes it difficult to analyze the paint and reduces the accuracy of the temperature measurement. It has thus not been possible to determine the amount of debris on the paint. See specification at page 2, lines 7-22.

Instant claim 1 recites "applying a marker paint." Such marker paint does not change color. During normal operating conditions, the temperature indicating paint and the marker paint are viewed to produce an image of the component, which is then analyzed to determine if any debris or dirt has deposited on the marker paint and its amount. The image of the irreversible temperature indicating paint is analyzed to determine the temperature at different regions of the component taking into account the amount of any debris on the marker paint.

See specification at page 3, line 22-page 4, line 28, and page 10, line 3-page 11, line 30. Such marker paint can withstand temperatures of up to at least 1000°C and does not substantially change color, even when the engine is run at maximum operating conditions for three full minutes. See specification at page 5, lines 24-28.

In contrast, Smith involves viewing the temperature indicating paint on the component under normal operating conditions with a boroscope and a digital camera to obtain images. These images are then analyzed to determine the temperature to which different regions of the component have been subjected. However, Smith filters the image to remove unwanted information such as color caused by soot. See Smith at col. 7, lines 17-19. Additionally, Smith does not apply a marker paint that does not change color with temperature to the component. Accordingly, Smith does not view marker paint or analyze the image to determine if any debris or dirt has been deposited on the marker paint; does not determine the amount of any debris left on the marker paint; and nowhere analyzes the temperature indicating paint to determine the temperature of different regions while taking into account the amount of debris or dirt deposited on the marker paint.

Bhardwaj discloses painting parts with temperature sensitive paint; operating the machine for a predetermined period of time; placing the part in a light controlled environment; producing an image with a camera; and comparing those images to a standard set of colors for the temperature sensitive paint. Bhardwaj, however, does not apply a marker paint that does not change color with variations in the temperature of the component; does not teach viewing the marker paint on the component; does not analyze the image to determine if any debris or dirt has been deposited on the marker paint; does not determine the amount of any debris or dirt on the marker paint; and accordingly, does not analyze the image of the indicating paint to determine the temperature at different regions of the component while taking into account the amount of debris or dirt deposited on the marker paint.

Wasserman discloses a paint with high infrared reflectivity and low gloss properties. Wasserman discloses that the paint provides chemical agent resistant coating, which imparts an increase in the reflectivity at the thermal infrared region, while controlling the color in the visible range and maintaining a low gloss. See Wasserman at Abstract. Wasserman, however, is applicable to coating naval vessels for avoidance of visual and infrared detection. In Wasserman, the paint comprises an extender, a pigment, a binder and a solvent. See Wasserman at col. 2, lines 30-40.

Supcoe discloses a blue gray low infrared emitting coating. Supcoe is utilized on the exposed surfaces of naval vessels or on the hot surfaces of gas turbine engine exhausts. Supcoe's coating exhibits low reflectance in the visual range of the light spectrum and high reflectance in the infrared range. Supcoe's coating reduces surface heat and provides visual camouflage and protection against infrared detection. See Supcoe at col. 1, lines 27-35.

However, neither of Wasserman nor Supcoe disclose paint that changes color at a given operating temperature of a gas turbine engine; the application of indicating paint to the same components as does instant claim 1; viewing the paint; analyzing the image to determine the amount of debris on the paint; or analyzing the image of the indicating paint to determine the temperature at different regions of the component taking into account any dirt or debris.

Mar discloses a low infrared emissivity paint comprising an oxime-cured silicon binder. In Mar, the paint is used in applications requiring nuclear flash protection. See Mar at col. 1, lines 51-56.

Thus, although Smith and Bhardwaj appear to relate to the same field of technology as the claimed invention, it would not have been obvious to an ordinarily skilled artisan to combine Smith and Bhardwaj with any of Wasserman, Supcoe or Mar, because they are not analogous fields of technology. Smith and Bhardwaj relate to analyzing indicating paints as

applied to machine components that are run for a period of time and are used to produce an image that is analyzed for a temperature profile. In contrast, Wasserman, Supcoe and Mar relate to paints as applied to naval vessels for camouflage from visible light or infrared radiation, or to protect against nuclear flash.

Hence, an ordinarily skilled artisan in the field of thermal paint analysis would not have looked from Smith or Bhardwaj to any of Wasserman, Supcoe or Mar as that they are non-analogous arts. Wasserman, Supcoe and Mar are directed toward camouflages and nuclear flash protection, whereas the instant claims are directed toward irreversible temperature indicating paint utilized for determining the temperature profile at different regions of components while taking into consideration dirt and debris. Moreover, Wasserman, Supcoe and Mar fail to disclose "marker paints" that are color stable at the requisite temperatures for the instant claimed invention. Thus, Wasserman, Supcoe and Mar would be inoperable if combined with either of Smith and Bhardwaj, and thus do not obtain the claimed features of instant claim 1. Finally, nowhere does the combination of Wasserman, Supcoe and Mar as combined with Smith or Bhardwaj teach or suggest viewing the "marker paint" in combination with viewing the irreversible temperature indicating paint; analyzing the image to determine if any debris or dirt is on the marker paint; determining the amount of any debris or dirt on the marker paint; and analyzing that image to determine the temperature profile of the component while taking into account the amount of debris.

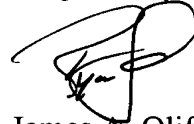
For at least the foregoing reasons, instant claim 1, from which claims 2-22 variously depend, is patentable over any combination of Wasserman, Supcoe, Mar, Smith and Bhardwaj. Reconsideration and withdrawal of the rejection are earnestly solicited.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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